

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) In a superjunction semiconductor device; a semiconductor body ~~region~~ of a first conductivity type and having parallel top and bottom surfaces; a plurality of spaced pylons of the other conductivity type extending through at least a portion of the thickness of said ~~body region~~; a body; a plurality of MOSgated structures, each respective MOSgated structure including a source region disposed in a ~~channel~~ body region which is positioned above and in contact with ~~each one~~ of said pylons, each of said pylons having a substantially constant diameter, the major length of said pylons extending from their ends which are closest to said bottom surface being in charge balance with the body ~~region~~ surrounding them; the remaining length of each of said pylons at the top thereof having a higher concentration than that of said major length whereby avalanche current is at least partly directed toward the center of the top of said pylon and away from ~~the R_s region in said channel and~~ a region beneath said source region.

2. (Original) The device of claim 1 wherein said charge in said remaining length is up to about 20% greater than that in said major length of said pylon.

3. (Original) The device of claim 1 wherein said remaining length of said pylons is less than about 25% of the length of said pylon.

4. (Original) The device of claim 2 wherein said remaining length of said pylons is less than about 25% of the length of said pylon.

5. (Currently Amended) A P type semiconductor pylon in an N type body for a superjunction device; said P type pylon having an increased concentration at its top end which is greater than and overbalances the concentration of the surrounding N type body; the remainder of the length of said pylon being in charge balance with the surrounding N type body, said pylon having a substantially constant diameter.

6. (Original) The device of claim 5 wherein said charge in said remaining length is up to about 20% greater than that in said major length.

7. (Original) The device of claim 5 wherein said remaining length of said pylons is less than about 25% of the length of said pylon.

8. (Original) The device of claim 6 wherein said remaining length of said pylons is less than about 25% of the length of said pylon.

9. (Currently Amended) A superjunction device having ~~improved~~ avalanche capability; said device comprising a semiconductor wafer body of one conductivity type and having a major electrode on the bottom of said wafer; a plurality of identical and spaced pylons of the other conductivity type extending through at least a portion of the thickness of said wafer; at least the lower portions of said pylons being in charge balance with said wafer body; and a portion of the top of said pylons having a greater charge than that of said lower portions, each of said pylons having a substantially constant diameter.

10. (Original) The device of claim 9 wherein the charge in said top of said pylons is about at least 15 to 20% greater than that of said lower portions.

11. (Original) The device of claim 9 wherein the length of said portion of said top is less than about 25% of the full length of said pylons.

12. (Original) The device of claim 10 wherein the length of said portion of said top is less than about 25% of the full length of said pylons.

13. (Currently Amended) The device of claim 9 which further includes a MOSgated ~~structures~~ structure disposed at the top of each of said pylons; ~~said~~ each MOSgated structure comprising a ~~channel~~ body region of said opposite conductivity type and which extends across

and overlaps its respective pylon; ~~[[a]]~~ respective source ~~region~~ regions of said one conductivity extending into ~~each of each channel regions~~ said body region and defining ~~[[R_b]]~~ regions in said ~~channels~~ body region and beneath said ~~sources~~ respective source regions which are removed from the outer periphery of said pylon top; a gate structure extending across respective invertible channel regions between said respective source regions and ~~channel regions~~ said wafer body at the top of said wafer body; and a source electrode extending over the top of said wafer body and in contact with ~~each of~~ said respective source regions and ~~channel regions~~ said body region.

14. (Original) The device of claim 13 wherein the charge in said top of said pylons is about at least 15 to 20% greater than that of said lower portions.

15. (Original) The device of claim 13 wherein the length of said portion of said top is less than about 25% of the full length of said pylons.

16. (Original) The device of claim 14 wherein the length of said portion of said top is less than about 25% of the full length of said pylons.